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HEPATITIS B

A Summary of the Occupational Health Concern

2nd Edition

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Second Edition

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HEPATITIS B--A SUMMARY OF THE OCCUPATIONAL HEALTH CONCERN

This publication was prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational risk of Hepatitis B. It revises and updates the 1986 edition. It provides new information on the development, treatment and prevention of Hepatitis B.

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1. WHAT IS HEPATITIS B?

Hepatitis B is an infectious liver disease. It is caused by the hepatitis B virus. Infections of hepatitis B occur only if the virus is able to enter the blood stream and reach the liver. There, the virus reproduces, releasing large numbers of new virus into the bloodstream.

To combat the disease, the body has several defences. White blood cells, which protect the body from infections, attack and destroy the infected liver cells. The body also produces antibodies which circulate in the blood to destroy the virus and protect against future infections of hepatitis B. During the infection and recovery process, the liver may not function normally, causing illness that affects the entire body.

For reasons that are not completely understood, 10 percent of people who develop hepatitis B become carriers of the disease. Their blood remains infected for months, years, sometimes for life. Seventy percent of carriers develop chronic persistent hepatitis B. Most do not appear to be ill. The remaining 30 percent of carriers experience continuous liver disease. This often progresses to cirrhosis and then, after 30 to 40 years, possibly to liver cancer. At present, there is no way of curing carriers.

There are other kinds of viral hepatitis such as hepatitis A, and hepatitis Non-A, Non-B. These diseases and the viruses that cause them are not related to hepatitis B even though they also affect the liver.

2. HOW LONG DOES IT TAKE FOR HEPATITIS B TO DEVELOP?

The incubation period (the time between initial contact with the virus and onset of the disease) for hepatitis B ranges from 45 to 180 days with an average of 60 to 90 days. The length of the incubation period depends on the amount of virus to which a person is exposed. Exposure to a large dose of virus results in a short incubation period.

3. HOW COMMON IS IT?

In recent years, about 3000 cases of hepatitis B have been reported annually in Canada, but many more cases probably remain unreported. Incidence of the disease varies from region to region. Analysis of donated blood indicates that about 0.15 percent of donors carry the hepatitis B virus, although for patients in a general hospital it can be as high as 0.80 percent. Blood tests also indicate that about 5 percent of people in Canada have had hepatitis B at some point in their lives.

In the United States, the Centers for Disease Control estimate that 12,000 health-care workers become infected with the hepatitis B virus each year as a result of occupational exposure to blood. Of these, 500 to 600 require hospitalization, and over 200 die each year--12 to 15 directly from hepatitis B, 170 to 200 from cirrhosis, and 40 to 50 from liver cancer.

4. WHERE IS THE HEPATITIS B VIRUS FOUND AND HOW IS IT TRANSMITTED?

Blood is the major source of the hepatitis B virus in the workplace. It can also be found in other tissues and body fluids, but in much lower concentrations. The risk of transmission varies according to the specific source.

Blood

Direct contact with infected blood can transmit the hepatitis B virus through:

- punctures of the skin with blood-contaminated needles, lancets, scalpels, or other sharps
- splashes to skin bearing minute scratches, abrasions, burns, or even minor rashes
- splashes to mucous membranes in the mouth, nose, or eyes

To a lesser extent, indirect contact with blood-contaminated surfaces can also transmit the hepatitis B virus. The virus may be stable in dried blood for up to 7 days at 25°C. Hand contact with blood-contaminated surfaces such as laboratory benches, test tubes, or laboratory instruments may transfer the virus to skin or mucous membranes.

Saliva

Saliva of people with hepatitis B can contain the hepatitis B virus, but in very low concentrations compared with blood. Injections of infected saliva can transmit the virus, so bite injuries can also spread the disease. There are no reports of people getting hepatitis B from mouth contact with infected CPR manikins or mouthpieces of musical instruments.

Other Body Fluids and Tissues

Hepatitis B is found in semen, vaginal secretions, and breast milk. The virus can be transmitted during unprotected sexual intercourse, and from mother to infant during birth and through breast feeding.

Synovial fluid (joint lubricant), amniotic fluid, cerebrospinal fluid, and peritoneal fluid (found in the abdominal cavity) can contain the hepatitis B virus, but the risk of transmission to workers is not known.

Feces, nasal secretions, sputum, sweat, tears, urine, and vomit have not been implicated in the spread of hepatitis B. Unless they are visibly contaminated with blood, the risk from these fluids in the workplace is practically non-existent.

Hepatitis B is not transmitted by casual contact. For example, hospital employees who have no contact with blood, blood products, or blood-contaminated fluids are at no greater risk than the general public. However, the virus can spread through intimate contact with carriers in a household setting. Why this happens is not completely understood. Somehow, the virus can find its way into the bloodstream of fellow family members, possibly because of frequent physical contact with the small cuts or skin rashes. The virus can also spread through biting and possibly by the sharing of toothbrushes or razors.

5. WHAT OCCUPATIONS HAVE INCREASED RISK OF HEPATITIS B?

The risk of acquiring hepatitis B from the workplace depends on the amount of exposure to:

- human blood or blood products, or other body fluids and tissues known to transmit the hepatitis B virus
- needlestick injuries or other puncture injuries from sharp instruments contaminated with blood
- close contact with people who carry the hepatitis B virus in family or institutional residence settings

Blood tests show that certain occupational groups have different risks of getting hepatitis B.

Table - Risks to occupational groups

Percentage of People Having Evidence of Past Hepatitis B Infection	Occupational Group
High (over 20%)	Pathologists, biochemistry and hematology laboratory personnel, dialysis staff
Intermediate (7-20%)	Hospital nurses, laboratory personnel other than those in high risk groups, staff of institutions for the developmentally handicapped, dentists
Low (less than 7%)	Administrative hospital staff, medical and dental students, healthy adults

In general, occupational groups with increased risk include:

- health-care workers repeatedly exposed to blood or blood products or those who are at risk of needlestick injury
- dentists, dental assistants, and dental hygienists
- certain staff members of institutions for the developmentally handicapped
- staff of institutions where workers may be exposed to aggressive, biting residents
- embalmers

6. HOW DO YOU KNOW IF YOU HAVE HEPATITIS B?

In mild cases, the signs and symptoms are those of a minor infection. In severe cases, they are extreme reactions resulting from liver failure. The extent of the illness depends on the original size of the dose of the virus, the route of exposure, and the specific response of the infected individual.

More than half of hepatitis B infections occur and pass without noticeable symptoms. Sometimes, only mild symptoms such as a general discomfort occur. Rarely is medical attention needed. Often, the infection disappears without treatment. In fact, laboratory testing is often the only way of determining whether someone has had hepatitis B.

When symptoms develop, the earliest ones often include a general discomfort, fatigue, lack of appetite, skin rash or possibly nausea, vomiting or other flu-like symptoms.

In a relatively few cases, these symptoms are followed by jaundice causing skin to yellow and urine to darken--typical signs of a malfunctioning liver. An accumulation of a waste product in the blood causes this yellowish colour. Jaundice and other symptoms usually subside gradually within 3 to 4 weeks and most patients fully recover, in the process becoming immune to the disease.

People with serious cases of hepatitis B require hospitalization. A very small proportion of these patients develop a critical form of the disease called "fulminant" hepatitis B. This condition results from a sudden breakdown of liver function. Fulminant hepatitis B is extremely serious. Over half of the victims of fulminant hepatitis B die from the disease.

7. WHAT LABORATORY TESTS ARE AVAILABLE FOR HEPATITIS B?

Tests are available to detect three substances called antigens to identify the hepatitis B virus. The tests determine if the virus is present in the body tissue or blood. The amount of each type of antigen present indicates how advanced the disease is and how infective the individual has become.

Other tests are available to detect the body's reaction to the viral infection or the body's reaction to vaccination against the virus. These tests work by measuring the number of antibodies present in the blood.

8. WHAT IS THE TREATMENT FOR HEPATITIS B?

At present, there is no specific treatment for patients with hepatitis B, although research is continuing. Physicians commonly recommend that patients with the disease limit their physical activity, although they do not necessarily restrict them to bed-rest. They also advise patients to drink clear liquids during the early stages of the infection and to avoid high-protein diets and alcohol. Hospitalization may be required for patients who suffer from severe vomiting and are unable to maintain adequate nutritional levels. It may also be required to prevent the development of complications.

9. HOW CAN THE SPREAD OF HEPATITIS B BE PREVENTED IN THE WORKPLACE?

The risk of hepatitis B can be significantly reduced by:

- implementing infection control guidelines suitable for the specific workplace
- immunizing workers at risk

Infection Control

Infection control precautions are the first line of defence to protect workers from hepatitis B and other blood-borne diseases. For this reason, the Laboratory Centre for Disease Control, Health and Welfare Canada, and the United States Department of Health and Human Services have developed a uniform approach called "universal precautions."

Originally developed for hospitals, universal precautions have been adapted to a wide range of workplaces. They apply universally to all situations where workers have risk of exposure to blood or certain body fluids.

The purpose of universal precautions is to prevent exposure to blood-borne diseases transmitted by needlestick accidents or fluid contact with an open wound, non-intact skin, or mucous membranes. Universal precautions are to be used in conjunction with control measures. An example is washing hands whenever gloves are removed or whenever the skin contacts potentially infectious fluids.

Universal precautions recommend the use of engineering controls, safe work practices, and personal protective equipment to suit the specific task and workplace.

Engineering controls include the use of equipment to isolate or contain the hazard, such as puncture-resistant containers for disposing of used sharps, or biological cabinets for certain procedures in laboratories.

Safe work practices are required for all tasks involving possible exposure to blood or certain body fluids. They include:

- safe collection of fluids and tissues for disposal in accordance with local, provincial, territorial, or federal regulations
- safe removal and disposal or decontamination of protective clothing and equipment
- procedures to follow in the event of spills or personal exposures such as needlestick injuries
- specific and detailed procedures to observe when using and disposing of needles and other sharp objects

Personal protective equipment provides a barrier to blood and certain body fluids. Equipment recommended by universal precautions include:

- gloves to protect the hands and skin
- masks and eye protection together or a face shield to protect mucous membranes of the eye, nose and mouth in any situation where splashes of blood or body fluids may occur
- gowns or aprons to protect clothing from splashes with blood, or impervious gowns if large quantities of blood are present or anticipated

Specific universal precautions have been developed for:

- health care workers
- emergency personnel, firefighters, and police
- laboratory personnel
- pathology personnel
- dentists and dental assistants
- workers in correctional institutions
- people required to perform CPR
- embalmers and morgue attendants

Sources for these universal precautions are listed in the Further Reading section at the end of of this publication. These precautions can serve as general guidelines for specific occupational groups. They can also be used as models for the development of guidelines for a specific workplace.

Immunization

There are two different types of hepatitis B vaccines available in Canada. One is processed from human serum and the other is produced by recombinant DNA. Both provide safe, reliable protection from hepatitis B when used either before

or immediately after exposure to the virus. Tests show 90 to 95 percent of vaccinations of healthy people result in the development of resistance against hepatitis B. At present, vaccination is the surest way to avoid acquiring hepatitis B as an occupational disease.

Immunization before Contact

The National Advisory Committee on Immunization recommends the vaccination of people who are at increased risk of contracting hepatitis B because of exposure to the virus in their work. They also recommend vaccination for people who are sexual or household contacts of carriers of hepatitis B.

Since the risk varies from workplace to workplace, institutions should review their situations and develop their own vaccination priorities. Hospital employees who have no contact with blood, blood products, or blood-contaminated body fluids and who are not at risk of needlestick injuries, are at no greater risk of hepatitis B than the general population.

Immunization after Contact

Workers who experience needlestick injuries, splash exposures to blood from carriers, or bite injuries should immediately seek medical attention. In some jurisdictions, local legislation outlines the procedure for treating these injuries.

If the blood is known to contain the hepatitis B virus, and the exposed worker has not been vaccinated or does not have antibodies against hepatitis B, post-exposure immunization is strongly recommended to prevent the development of hepatitis B.

National immunization guidelines recommend post-exposure vaccination when the source of blood is unknown. Vaccination against hepatitis B is usually recommended within seven days of exposure. Depending on the specific circumstance, hepatitis B immunoglobulin is sometimes recommended also. Immunoglobulin is a preparation containing antibodies which attack the hepatitis B virus. It is usually given as quickly as possible, preferably within 24 hours of the incident.

If the worker's blood has antibodies against hepatitis B, or if the contaminated blood is free of virus, further treatment may be unnecessary.

10. CONCLUSION

Hepatitis B is a serious occupational concern for workers who may be exposed to blood or certain body fluids. However, the use of universal precautions for blood and certain other body fluids, and immunization can greatly reduce or eliminate the risk of hepatitis B.

For further information, contact the Inquiries Service of the Canadian Centre for Occupational Health and Safety.

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